INTRAOCULAR LENS APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to introcular lens apparatus and, more particularly to intraocular lens apparauts including a lens having a plurality of clips mounted thereto for securing the lens to the iris of an eye, and a surgical tool which may be released from the lens when the lens is inserted into the posterior chamber.

2. Description of the Prior Art

For several years intraocular lenses, or artificial lenses, have been implanted by eye surgeons in the eyes of patients who have had cataracts removed. Historically, the first implants were large and had projections that tended to mechanically contact, and thus irritate the iris and ciliary body within the interior of the eye. More recent lenses have been made smaller to avoid mechanical contact with the interior walls of the eye.

An example of one of the newer lenses is a lens known as the Medallion lens. The Medallion lens has an aperture formed near its outer edge for receiving a suture therethrough. The lens is positioned in the anterior chamber of the eye and then sutured to the iris with a single suture. Eye operations involving Medallion lenses are relatively difficult since the suture must be brought through the posterior chamber of the eye before the lens can be secured to the iris. In addition, as is the case with most lenses that are inserted into the anterior chamber, should the lens become displaced and touch the endothelium inside the cornea of the eye, edema may be caused. Moreover, the lens is subject to rotational displacement about the single suture.

Another artificial lens is a lens known as the Binkhorst-Federov lens which includes a pair of nylon double loops formed in the shape of a cross. When inserting the lens into the anterior chamber of the eye, one double loop is disposed behind the iris and the other disposed in front of the iris. The lens is held in place by the constriction of the pupil. Thus, the patient is required to take myotic eye drops daily to maintain the lens in position. Generally, the drops are not a problem for older patients who are usually taking medications of one sort or another, but serve as a hindrance to younger patients. In addition, should the pupils dialate, the lens can subluxate and require reinsertion.

Still another example of an artificial lens is a lens having an X-shape, which similarly to the Binkhoist-Federov lens, has one set of opposite legs which fits over the iris and another set of opposite legs which fits under the iris such that the lens may be inserted into the plane of the iris. However, since the legs are not secured to the iris, this lens is also subject to dislocation upon dilation of the pupils.

SUMMARY OF THE PRESENT INVENTION

It is therefore an object of the present invention to provide an intraocular lens which is inserted into the posterior chamber of an eye and secured to the iris with clips.

Still another object of the present invention is to provide an intraocular lens having a front face and an outer periphery with a plurality of clips extending outwardly from the face and toward the periphery for securing the lens to the iris of the eye when the lens is inserted into the posterior chamber.

Still another object of the present invention is to provide in combination with the intraocular lens, a surgical tool to facilitate insertion of the lens into the posterior chamber and which may be easily released from the lens after insertion.

Briefly, the present invention is directed to an intraocular lens apparatus for inserting a lens into the posterior chamber adjacent the iris of an eye. The apparatus includes in combination a lens and a surgical tool for carrying the lens. The lens has a front face, a central portion, and an outer periphery and a plurality of cantilevered clips. Each clip is mounted to the central portion and extends outwardly from the face and toward the periphery. The clips are movable from an iris-receiving position to an iris-engaging position. The surgical tool has a handle portion and a foot portion with a face engaging surface for engaging the front face and a clip retaining surface for attaching the lens to the tool and for retaining the clips spaced from the face when the clip is in the iris-receiving position. When the clips are disposed on the retaining surface, the lens is secured to the tool. After the lens is selectively positioned in the posterior of the eye the clips are moved from the iris-receiving position to the iris-engaging position which detaches the lens from the tool and secures it to the iris. In a first embodiment the clips are comprised of a resilient material which serves to bias the clips toward the front face.

In a second embodiment, the clips are comprised of a deformable, malleable material, and are formed into the iris-receving position by bending each clip over the foot portion of the tool. Once the lens is inserted in its desired position, the foot portion is forced away from the front face. This movement forces the clips to move outwardly toward the periphery which detaches the lens from the tool and secures the lens to the iris.

A principal advantage of the present invention is that the intraocular lens is firmly and safely secured to the iris of the eye.

Another advantage of the present invention is that the intraocular lens apparatus facilitates insertion of the lens into the posterior chamber of the eye and allows the tool to be easily detached from the lens once the lens is in the desired position.

The foregoing and other objects, features and advantages of the invention will be apparent from the following detailed description of the preferred embodiments illustrated in the several figures of the drawing.

IN THE DRAWING

FIG. 1 is a plan view of the intraocular lens apparatus in accordance with the present invention.

FIG. 2 is a side elevational view of the intraocular lens apparatus of FIG. 1 with the eye illustrated in phantom.

FIG. 3 is a perspective view illustrating the lens inserted into the posterior chamber of the eye with a portion of the eye broken away for clarity.

FIG. 4 is a cross-sectional view taken through the lines 4—4 of FIG. 3.

FIG. 5 is a cross-sectional view of an alternative embodiment of the intraocular lens in accordance with the present invention.

FIG. 6 is a side elevational view of an alternative embodiment of the intraocular lens assembly with the lens shown in cross-section in accordance with the present invention.